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# Probing cosmic rays in AGN and Clusters of Galaxies using radio observations

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We are looking for radio relics' andhalos' in an X-ray selected sample of clusters of galaxies. Most galaxy clusters have cool cores with AGN (Active Galactic Nuclei) at their centre. These AGN contain particle bubbles that show non-thermal radio emission. The presence of radio relics και halos' observed at the periphery of the cluster radio structure could be explained if the bubbles can restrict cosmic rays efficiently.
Using radio (total intensity and polarization) data of AGN and X-ray observations of clusters of galaxies the intracluster magnetic fields and electron densities can be estimated and acceleration mechanisms of cosmic particles can be revealed.
The current article presents the progress of our work and future plans. We use radio and X-ray data of two powerful radio galaxies, hosts in galaxy clusters within dense environments. We study the role that intracluster magnetic fields, as well as jets and halos/relics play in the formation and acceleration of cosmic rays.
We also search for the relation between the extended regions of radio emission (known asrelics' and 'halos') and the cosmic rays, using our high quality radio data.

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